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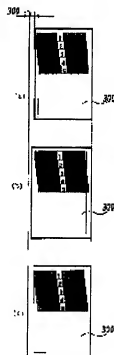
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(54) PRINTER AND PRINT SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To perform recording with a uniform margin regardless of variation in the size of a recording sheet without complicating the arrangement of a recorder or increasing the price thereof.
SOLUTION: A plurality of patches (301-305) are printed in stripe on a recording sheet. Each patch has a length equal to the lateral width of print range and identification information ('1'-'5') is printed thereon. Each patch is formed by shifting the print start position bit by bit in the lateral direction (main scanning direction). A user visually confirms a test pattern thus printed, selects a patch located in the center in the main scanning direction, and inputs that identification information. Print start position in the main scanning direction is stored when a patch corresponding to input information is formed and for subsequently print operation, uniform margin can be obtained on the left and right by defining the print start position in the printer based on the relevant print start position information.



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CLAIMS

[Claim(s)]

[Claim 1] In the printing equipment which prints an image to a print medium using a print head A means to make a test pattern with two or more parts from which the print position on said predetermined direction used in order to specify the print position of the image on said print medium in the predetermined direction differs from in said print head, A means to receive the input of the identification information corresponding to said part chosen from this test pattern, The printing equipment characterized by having a means to specify said print position at the time of an image print based on the print position information when forming said part corresponding to the inputted identification information concerned.

[Claim 2] It is the printing equipment according to claim 1 which said print head prints in the process relatively scanned to said print medium, and is characterized by said predetermined direction being the direction of said scan.

[Claim 3] Said test pattern means forming is a printing equipment according to claim 2 characterized by making it shift and form the specified quantity every about the location on the direction which intersects perpendicularly with plurality, said improvement in the method of a scan, and this direction the band-like part which extends in said scanning direction.

[Claim 4] Each of two or more of said parts is a printing equipment according to claim 1 to 3 characterized by being formed with said identification information.

[Claim 5] Said print position convention means is a printing equipment according to claim 2 to 4 characterized by specifying the print actuation starting position of said print head in the direction of said scan based on said print position information.

[Claim 6] In the printing equipment which prints an image to a print medium using a print head A means to detect the location of the both ends of said print medium in the predetermined direction, A means to ask for the width of face of said print medium in said predetermined direction from the location of the detected both ends concerned, and to calculate the amount of the margin prepared in said both ends of said print medium from this width of face and the formation range of the image printed in said predetermined direction, The printing equipment characterized by having a means to specify the print position in said predetermined direction of said image so that the margin of the amount concerned may be prepared in said print medium.

[Claim 7] It is the printing equipment according to claim 6 which said print head prints in the process relatively scanned to said print medium, and is characterized by said predetermined direction being the direction of said scan.

[Claim 8] Said detection means is a printing equipment according to claim 7 characterized by being prepared on the member which carries said print head and is made to scan in said predetermined direction, and detecting the location of the both ends of said print medium in said scanning direction.

[Claim 9] Said detection means is a printing equipment according to claim 6 to 8 characterized by having a means to detect the location of said both ends from the difference of the amount of reflected lights with the member which supports said print medium and this print medium.

[Claim 10] It is the printing equipment according to claim 7 to 9 which calculate said operation means as an amount of margins which prepare one half of the amounts which subtracted the formation range of said image from said width of face in said both ends, respectively, and be characterized by for said print position convention means to specify the print actuation starting position of said print head in the direction of said scan based on the value which added said amount of margins to the positional information of the end section of said print medium.

[Claim 11] Said print head is a printing equipment according to claim 1 to 10 characterized by having the gestalt of the ink jet head which prints by carrying out the regurgitation of the ink to said print medium.

[Claim 12] Said ink jet head is a printing equipment according to claim 11 characterized by having the heater element which generates the heat energy which makes ink produce film boiling as energy used in order to carry out the regurgitation of said ink.

[Claim 13] In the print system equipped with the image data feeder for supplying image data to the printing equipment which prints an image to a print medium using a print head A means to make a test pattern with two or more parts from which the print position on said predetermined direction used in order to specify the print position of the image on said print medium in the predetermined direction differs from in said print means, A means to receive the input of the identification information corresponding to said part chosen from this test pattern, The print system characterized by having a means to specify said print position at the time of an image print based on the print position information when forming said part corresponding to the inputted identification information concerned.

[Claim 14] It is the print system according to claim 13 which said print head prints in the process relatively scanned to said print medium, and is characterized by said predetermined direction being the direction of said scan.

[Claim 15] Said test pattern means forming is a print system according to claim 14 characterized by making it shift and form the specified quantity every about the location on the direction which intersects perpendicularly with plurality, said improvement in the method of a scan, and this direction the band-like part which extends in said scanning direction.

[Claim 16] Each of two or more of said parts is a print system according to claim 13 to 15 characterized by being formed with said identification information.

[Claim 17] Said print position convention means is a print system according to claim 14 to 16 characterized by specifying the print actuation starting position of said print head in the direction of said scan based on said print position information.

[Claim 18] In the print system equipped with the image data feeder for supplying image data to the printing equipment which prints an image to a print medium using a print head A means to detect the location of the both ends in the predetermined direction of said print medium set in said printing equipment, A means to ask for the width of face of said print medium in said predetermined direction from the location of the detected both ends concerned, and to calculate the amount of the margin prepared in said both ends of said print medium from this width of face and the formation range of the image printed in said predetermined direction, The print system characterized by having a means to specify the print position in said predetermined direction of said image so that the margin of the amount concerned may be prepared in said print medium.

[Claim 19] It is the print system according to claim 18 which said print head prints in the process relatively scanned to said print medium, and is characterized by said predetermined direction being the direction of said scan.

[Claim 20] Said detection means is a print system according to claim 19 characterized by being prepared on the member which carries said print head and is made to scan in said predetermined direction, and detecting the location of the both ends of said print medium in said scanning direction.

[Claim 21] Said detection means is a print system according to claim 18 to 20 characterized by having a means to detect the location of said both ends from the difference of the amount of reflected lights with the member which supports said print medium and this print medium.

[Claim 22] It is the print system according to claim 19 to 21 which calculate said operation means as an amount of margins which prepare one half of the amounts which subtracted the formation range of said image from said width of face in said both ends, respectively, and characterize by for said print position convention means to specify the print actuation starting position of said print head in the direction of said scan based on the value which added said amount of margins to the positional information of the end section of said print medium.

[Claim 23] Said print head is a print system according to claim 13 to 22 characterized by having the gestalt of the ink jet head which prints by carrying out the regurgitation of the ink to said print medium.

[Claim 24] Said ink jet head is a print system according to claim 23 characterized by having the heater element which generates the heat energy which makes ink produce film boiling as energy used in order to carry out the regurgitation of said ink.

[Claim 25] It is the print position convention approach for specifying the print position of the image in the printing equipment which prints an image to a print medium using a print head. The process which makes a test pattern with

two or more parts from which the print position on said predetermined direction used in order to specify the print position of the image on said print medium in the predetermined direction differs from in said print means, The process which receives the input of the identification information corresponding to said part chosen from this test pattern, The print position convention approach characterized by having the process which specifies said print position at the time of an image print based on the print position information when forming said part corresponding to the inputted identification information concerned.

[Claim 26] It is the print position convention approach for specifying the print position of the image in the printing equipment which prints an image to a print medium using a print head. The process which detects the location of the both ends in the predetermined direction of said print medium set in said printing equipment, The process which asks for the width of face of said print medium in said predetermined direction from the location of the detected both ends concerned, and calculates the amount of the margin prepared in said both ends of said print medium from this width of face and the formation range of the image printed in said predetermined direction, The print position convention approach characterized by having the process which specifies the print position in said predetermined direction of said image so that the margin of the amount concerned may be prepared in said print medium.

[Claim 27] The control program for making the print system equipped with the image data feeder for supplying image data to the printing equipment which prints an image to a print medium using a print head perform an approach according to claim 25 or 26.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the allocation technique of the image print range over a print medium in the so-called printing equipment of the serial printer gestalt which prints carrying out the relative scan of the print head for giving a print agent to a print medium to a print medium about a printing equipment and a print system.

[0002]

[Description of the Prior Art] The printing equipment used for a printer, a copying machine, facsimile, etc. is constituted so that the image which consists of a dot pattern on print media, such as paper, plastics sheet metal, and cloth, may be printed based on image information. A printing equipment can be divided into an ink jet type, a wire dot type, a thermal type, a laser-beam type, etc. with a print method, and the printing equipment (ink jet printing equipment) by the ink jet type of them makes ink (print liquid) breathe out as a drop from the delivery established in the print head, and it is constituted so that it may print by making this adhere to a print medium.

[0003] Here, prepare an electric thermal-conversion component (heater) in the liquid route which is open for free passage to a delivery further, ink is made to produce film boiling at an ink jet ceremony by generation of heat accompanying the energization, and there are a thing of the method (Bubble Jet by Canon, Inc.) which makes ink breathe out by the expansion force of the generated air bubbles, a thing of a method which an electric machine sensing element (piezo-electric element) is prepared [thing] in a liquid route, and makes ink breathe out by telescopic motion accompanying the energization in it.

[0004] Moreover, as a print medium, the so-called thing of the cut sheet gestalt cut into predetermined size is used, and also the so-called thing of the roll-sheet gestalt which involved in and formed one side of a web-like print medium, or the thing of the so-called fan-folded paper gestalt which folded up and formed the web-like print medium in the perforation part is used, these are cut or detached to the die length of predetermined or a request after the print of the specified quantity, and a user is provided with them.

[0005] and to the print medium used for an ink jet-type printing equipment The layer which becomes with the construction material for using paper etc. as the base and improving the absorptivity of ink thru/or fixable on it, What the layer which becomes with the construction material for making color enhancement of ink good, or the layer which becomes with the construction material which improves the weatherability and the water resisting property of ink prepared by spreading etc. (the so-called coat paper) is used, and there are things. While forming an image in high definition by these, the device which can hold the grace of the formed image for a long time is made.

[0006]

[Problem(s) to be Solved by the Invention] By the way, in an ink jet-type printing equipment, when the print range becomes large from the size of the print medium to be used, ink will be breathed out by the outside of a print medium and there is a possibility that the ink may soil the interior of equipment and the rear face of a print medium. Then, generally, from the size of the print medium to be used, the print range is made small and a print is performed. And the difference of the print range and the size of a print medium serves as a margin.

[0007] Since the base is paper even if it is, when using coat paper which was mentioned above, of course for the improvement in image grace thru/or maintenance when the so-called regular paper was used as a print medium, the width of face of a print medium etc. may change with telescopic motion of the print medium by dispersion on manufacture, and environmental conditions, such as humidity. On the other hand, since the print range is fixed in a

printing equipment and image formation is performed, when changing the size of a print medium, dispersion will arise in a margin. Image grace may be sensed low for a user's eyes when a print medium is seen as a whole, though dispersion in a margin will be recognized so notably that setting out of the print range will be carried out soon at the size of a print medium (i.e., so that a margin is made small), consequently the image itself was formed in high definition. Especially, this is considered to be excessive, when the margin by the side of the left right end of a print medium is uneven.

[0008] Using drawing 1, when a difference is in the width of face of the margin of print medium right and left, signs that image grace will be recognized low are explained. 300 show among drawing the image formed in the print medium P. As for a left end margin and 307, 306 is [the print range (width of face of the image formed) and 308] right-hand side margins. Among drawing, (a), (b), and (c) show signs that the size (width of face) of a print medium varied within specification, and (a) presupposes that the minimum thing in specification and (b) are [the thing as specification and (c)] them the greatest things within specification. If the size of a print medium varies like drawing 1 even if it is the thing of the same specification, since image size is fixed, the grace of the image which margin width of face on either side became an uniformity, consequently was formed will be recognized low.

[0009] In JP,11-69099,A, invention which made it the technical problem to adjust the image write-in location in the image output sections, such as a plotter, automatically using a test chart (resist adjustment) is indicated. In the technique of this number official report disclosure, a test chart is read by the image read station, a necessity judgment of resist adjustment of an image read station is made by CPU, and adjustment [in / when judged as the adjustment need / an image read station] is performed. A test chart image [still finishing / amendment processing] is printed out by the image output section, the display image of the printed-out test chart processed [amendment] is read by the image read station, and a resist adjustment judgment of the image output section is made by CPU. And if a resist error is in a reading result, it will judge it as the error in the image output section, and resist adjustment in the image output section will be performed.

[0010] However, although the direction which has shifted is known even if it is going to apply actually because of margin equalization of this technique, it is very difficult to judge the amount of gaps of which has arisen actually. Moreover, the reading sections, such as a scanner, will be needed for the amount detection of gaps, and an expensive rank will be formed by the part printing equipment. This invention aims at enabling it to print with a suitable amount, for example, a uniform margin, without producing complication and the formation of an expensive rank of the configuration of a printing equipment, even if it was made in view of the above trouble and dispersion is in the size of a print medium.

[0011]

[Means for Solving the Problem] Therefore, with the 1st gestalt of this invention, it sets to the printing equipment which prints an image to a print medium using a print head. A means to make a test pattern with two or more parts from which the print position on said predetermined direction used in order to specify the print position of the image on said print medium in the predetermined direction differs form in said print head. It is characterized by having a means to receive the input of the identification information corresponding to said part chosen from this test pattern, and a means to specify said print position at the time of an image print based on the print position information when forming said part corresponding to the inputted identification information concerned.

[0012] Moreover, it sets to the print system equipped with the image data feeder for supplying image data with the 2nd gestalt of this invention to the printing equipment which prints an image to a print medium using a print head. A means to make a test pattern with two or more parts from which the print position on said predetermined direction used in order to specify the print position of the image on said print medium in the predetermined direction differs form in said print means. It is characterized by having a means to receive the input of the identification information corresponding to said part chosen from this test pattern, and a means to specify said print position at the time of an image print based on the print position information when forming said part corresponding to the inputted identification information concerned.

[0013] Furthermore, it is the print position convention approach for the 3rd gestalt of this invention to prescribe the print position of the image in the printing equipment which prints an image to a print medium using a print head. The process which makes a test pattern with two or more parts from which the print position on said predetermined direction used in order to specify the print position of the image on said print medium in the predetermined direction differs form in said print means. It is characterized by having the process which receives the input of the identification

information corresponding to said part chosen from this test pattern, and the process which specifies said print position at the time of an image print based on the print position information when forming said part corresponding to the inputted identification information concerned.

[0014] Said print head can be printed above in the process relatively scanned to said print medium, and said predetermined direction can be made into the direction of said scan.

[0015] The location on the direction which intersects perpendicularly with plurality, said improvement in the method of a scan, and this direction the band-like part which extends in said scanning direction is shifted the specified quantity every, and is made to form at said test pattern means forming or process here.

[0016] Moreover, each of two or more of said parts shall be formed with said identification information.

[0017] Moreover, a print position convention means or a process shall prescribe the print actuation starting position of said print head in the direction of said scan based on said print position information.

[0018] A test pattern with two or more parts which shifted the print position on a print medium little by little, and were formed in this invention concerning the above gestalt is printed. In the image which viewed this and was printed choosing a part which is located at the core of a print medium, and inputting the identification information From next time, by a print being made to be performed in the print starting position of the part, it is not based on dispersion in the width of face of a print medium, but a formation image is positioned in a core, and a margin on either side can be made into homogeneity.

[0019] Moreover, with the 4th gestalt of this invention, it sets to the printing equipment which prints an image to a print medium using a print head. A means to detect the location of the both ends of said print medium in the predetermined direction, A means to ask for the width of face of said print medium in said predetermined direction from the location of the detected both ends concerned, and to calculate the amount of the margin prepared in said both ends of said print medium from this width of face and the formation range of the image printed in said predetermined direction, It is characterized by having a means to specify the print position in said predetermined direction of said image so that the margin of the amount concerned may be prepared in said print medium.

[0020] Moreover, it sets to the print system equipped with the image data feeder for supplying image data with the 5th gestalt of this invention to the printing equipment which prints an image to a print medium using a print head. A means to detect the location of the both ends in the predetermined direction of said print medium set in said printing equipment, A means to ask for the width of face of said print medium in said predetermined direction from the location of the detected both ends concerned, and to calculate the amount of the margin prepared in said both ends of said print medium from this width of face and the formation range of the image printed in said predetermined direction, It is characterized by having a means to specify the print position in said predetermined direction of said image so that the margin of the amount concerned may be prepared in said print medium.

[0021] Moreover, it is the print position convention approach for the 6th gestalt of this invention to prescribe the print position of the image in the printing equipment which prints an image to a print medium using a print head. The process which detects the location of the both ends in the predetermined direction of said print medium set in said printing equipment, The process which asks for the width of face of said print medium in said predetermined direction from the location of the detected both ends concerned, and calculates the amount of the margin prepared in said both ends of said print medium from this width of face and the formation range of the image printed in said predetermined direction, It is characterized by having the process which specifies the print position in said predetermined direction of said image so that the margin of the amount concerned may be prepared in said print medium.

[0022] In these [4th] thru/or the 6th gestalt, said print head can be printed in the process relatively scanned to said print medium, and said predetermined direction can be made into the direction of said scan.

[0023] Here, at said detection means or process, it shall be prepared on the member which carries said print head and is made to scan in said predetermined direction, and the location of the both ends of said print medium in said scanning direction shall be detected.

[0024] Moreover, at said detection means or process, a means to detect the location of said both ends from the difference of the amount of reflected lights with the member which supports said print medium and this print medium can be used.

[0025] Furthermore, at said operation means or process, it shall calculate as an amount of margins which prepares one half of the amounts which subtracted the formation range of said image from said width of face in said both ends, respectively, and the print actuation starting position of said print head in the direction of said scan shall be specified in

said print position convention means or process based on the value which added said amount of margins to the positional information of the end section of said print medium.

[0026] In this invention concerning the 4th thru/or the 6th gestalt, a print starting position is not depended on dispersion in the width of face of a print medium by detecting the edge and width of face of a print medium by considering as the location to which only the one half of the difference of print image width and the width of face of a print medium was moved from the end section, but a formation image is positioned in a core, and a margin on either side can be made into homogeneity.

[0027] Furthermore, it shall have the gestalt of the ink jet head which prints when said print head carries out the regurgitation of the ink above to said print medium, and said ink jet head shall have further the heater element which generates the heat energy which makes ink produce film boiling as energy used in order to carry out the regurgitation of said ink.

[0028] In addition, this invention consists in the control program for making the print system equipped with the image data feeder for supplying image data to the printing equipment which prints an image to a print medium using a print head perform the approach concerning the 3rd or 6th gestalt of the above.

[0029] In addition, in this description, a "print" (it may be call "record") shall mean the case where processing of a print medium be perform, when not ask whether it actualize so that not only when form significant information, such as an alphabetic character and a graphic form, but significant non-mind may not be ask and human being may perceive visually but form an image, a pattern, a pattern, etc. on a print medium widely.

[0030] Moreover, a "printing equipment" shall mean not only one completed equipment that prints but the equipment which bears the function to perform a print.

[0031] Moreover, with a "print medium", not only the paper used with a common printing equipment but it is large, and although objects [, such as glass, ceramics, timber, and leather,] which can receive ink, such as cloth, a plastics film, and a metal plate, shall also be said, below, it considers as a "form" or the thing only called "paper."

[0032] Furthermore, "ink" (it may be called a "liquid") shall say the liquid with which formation of an image, a pattern, a pattern, etc., processing of a print medium, or processing (for example, coagulation or insolubilization of the color material in the ink given to a print medium) of ink is presented by being widely interpreted like the definition of the above "a print" and being given on a print medium.

[0033]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained to a detail with reference to a drawing.

[0034] (Equipment configuration) Drawing 2 shows the example of an outline configuration of the ink jet printing equipment by 1 operation gestalt of this invention.

[0035] In the ink jet printing equipment of a graphic display, it is fixed to the endless belt 201, and carriage 200 is movable along with the guide shaft 202. The endless belt 201 is wound around pulleys 203 and 204, and the driving shaft of the carriage drive motor 204 is connected with the pulley 203. Therefore, along with the guide shaft 202, horizontal scanning of the carriage 200 is carried out in the both-way direction (the direction of A) with revolution actuation of a motor 204. On carriage 200, the ink tank 205 as a container which contains the print head 1 and ink in which two or more ink deliveries were arranged is carried.

[0036] Two or more ink deliveries arranged in the conveyance direction (the direction of vertical scanning) of Form P are formed in the form P as a print medium, and the field which counters at the print head 1. It is open for free passage to each of two or more deliveries, a liquid route is established in a print head 1, and the electric thermal-conversion object (heater element) which generates the heat energy used for the ink regurgitation is prepared in it corresponding to each liquid route. An electric thermal-conversion object generates heat by impressing an electrical signal pulse according to actuation data, makes ink produce film boiling by this, and makes ink breathe out from a delivery with generation of the air bubbles. The common liquid room which is open for free passage common to these is established in two or more liquid routes, and ink is supplied from the ink tank 205 to this common liquid room.

[0037] In addition, the group of a print head 1 and the ink tank 205 can prepare the number corresponding to the ink color to be used, and is prepared 4 sets in the example of a graphic display corresponding to four colors (for example, black, yellow, a Magenta, cyanogen).

[0038] Moreover, the linear encoder 206 is formed in the equipment of a graphic display for the object of detecting the migration location of the improvement in the method of horizontal scanning of carriage. There is a linear scale 207

formed along the migration direction of carriage 200 as one component of a linear encoder 206, and it is 1 inch (reference value.) in this linear scale 207. It is consistencies, such as 600 about 25.4mm hits, and the slit is formed at equal intervals. On the other hand, the detection system 208 and digital disposal circuit of a slit which have a light-emitting part and a photo sensor are prepared in carriage 200 as a component of another side of a linear encoder 206. Therefore, from a linear encoder 206, the regurgitation timing signal for specifying ink regurgitation timing and the positional information of carriage are outputted with migration of carriage 200. If it is constituted so that the regurgitation of the ink may be carried out for every slit detection, it will become possible to perform the print of the resolution of 600dpi (dots per inch) to a main scanning direction.

[0039] The detail paper P as a print medium is intermittently conveyed in the direction of arrow-head B which intersects perpendicularly with the scanning direction of carriage 200. The recording paper P is supported with the roller units 209 and 210 of the couple of the conveyance direction upstream, and the roller units 211 and 212 of a downstream couple, and where fixed tension was given and the surface smoothness to a print head 1 is secured, it is conveyed. The driving force to each roller unit is transmitted from the form conveyance motor which is not illustrated. [0040] The print to the whole form P is performed repeating the print of width of face and conveyance of Form P corresponding to the array width of face of the delivery of a print head 1 by turns with migration of carriage 200 by the above configurations.

[0041] In addition, carriage 200 stops at a home position if needed during the time of print initiation, or a print. The cap member 213 which carries out capping of the field (delivery side) in which the delivery of each print head 1 was established is formed in this home position, and the attraction recovery means (un-illustrating) for attracting ink from a delivery compulsorily to this cap member 213, and preventing the blinding of a delivery etc. is connected.

[0042] Drawing 3 shows the example of a configuration of the control system of the ink JUTTO printing equipment shown in drawing 2.

[0043] CPU100 will perform control, data processing, etc. of each part of a printing equipment, if print information is received from the host equipment H (the gestalt of a computer, an image reader, a digital camera, etc. is made good.) which forms the supply source of image data. The fixed data of the processing program corresponding to the various procedure which CPU100 performs, or others are memorized by ROM101, and RAM102 is used for it as a work area in the case of the procedure activation etc.

[0044] That is, CPU100 processes the print information received from host equipment H using peripheral units, such as RAM102, based on the control program memorized by ROM101, and performs processing of changing into the print data suitable for performing print actuation with a printing equipment. Moreover, CPU100 outputs the actuation data, i.e., the print data, and the actuation control signal of an electric thermal-conversion object which were mentioned above to the head driver 103. The head driver 103 drives the electric thermal-conversion object of a print head 1 based on the inputted actuation data.

[0045] moreover -- CPU -- 100 -- carriage -- 200 -- a round trip -- a scan -- carrying out -- making -- a sake -- carriage -- a drive motor -- 204 -- and -- record -- a form -- P -- conveying -- a sake -- a form -- conveyance -- ((PF)) -- a motor -- 104 -- respectively -- Motor Driver 105 and 106 -- minding -- actuation control -- carrying out . Moreover, the positional information of a regurgitation timing signal and carriage is inputted into the head driver 103 from a linear encoder 206. In addition, in drawing 3, 6 is a paper-end-detecting means used by the 2nd example of the margin adjustment at the right end of [which is mentioned later] the left, and detects the left right end of the record form P under control by CPU100.

[0046] (Margin adjustment of the point back end) Drawing 4 is the mimetic diagram which showed the example of a configuration of the record form conveyance system of the ink jet printing equipment shown in drawing 2, and was seen from the side of drawing 2. In drawing, the record form P which is a roll sheet and is a print medium is manufactured for a long time by the lengthwise direction (the direction of B of drawing 1) in the shape of a web, and 220 has twisted one side around the heart 221. 223 is a cutter unit and can cut the record form P by predetermined die length. The cutter by which 224 performs the cutting actuation concerned, and 225 are the hold sections which hold a cutting piece.

[0047] On the occasion of a print, the point of the record form P is cut first and the record form P is rewound towards a specified quantity roll. If the PF motor 104 serves as this driving source and uses a stepping motor, the exact feed of it will be attained from the ability of the amount according to a driving pulse to be rotated.

[0048] On the conveyance direction, since the distance to the location where print actuation is started from the

arrangement location of the cutter unit 223 by the print head 1 carried in carriage 200 is known, if the record form P is rewound by the distance and a print is started, the head margin on the record form P will be set to 0mm. Moreover, a head margin will be set to 5mm if it prints by rewinding only an amount small 5mm. Namely, the head margin of a request dimension can be established now by considering as the amount which reduced the desired amount of head margins from distance with the location where print actuation is started by the arrangement location and print head of the conveyance direction top cutter unit 223 in the amount of rewinding after cutting the record form P in this way. [0049] Moreover, after termination of a print, since the location where the print head ended print actuation is known, only the amount which added a part for a desired back end margin to the distance from the location to the cutter unit 223 feeds with the record form P in the direction of the cutter unit 223. By cutting the record form P using the cutter unit 223, it becomes possible to prepare a back end margin in accuracy.

[0050] Usually, a desired paper size is chosen according to print size. Then, the size which lengthened the head margin and the back end margin can be set up as print size of a lengthwise direction from the selected paper size. Especially, if it is an ink JUTTO printing equipment using a roll sheet like drawing 4, a head margin and a back end margin will be made with homogeneity and a desired amount, and if there is no limit in the paper size of a lengthwise direction, a print with the print size as a request and point back end margin size is realizable.

[0051] (The 1st example of the margin adjustment at the right end of the left) The 1st example of the margin adjustment at the right end of the left is explained using drawing 5 - drawing 7.

[0052] The 1st example concerned is the margin adjustment method of the manual type which permits the scan by the user, and drawing 5 shows an example of the procedure performed in that case.

[0053] For example, if margin adjustment mode is set up through the printer driver which works on host equipment H, this procedure will start, and a test pattern is printed, controlling each part of a printing equipment suitably, if CPU100 receives the test pattern printing instruction outputted from host equipment H (step S1).

[0054] Drawing 6 is an example of the print mode of the test pattern, and prints the five band-like patches 301-305 on the record form P in this example. Patches 301-305 are band-like things with die length equal to the breadth of the print range, and "1", "2", "3", "4", "5", and a number are printed in order as identification information. Moreover, the print starting position in a longitudinal direction (main scanning direction) shifts each patch little by little, and it is formed. It sets up when a record paper size is a thing as a design value so that this patch 303 with which the number "3" was given to the amount by shifting may be located at the core of the main scanning direction (longitudinal direction) of a record form, namely, so that the amount of margins on either side may become equal about patch 303.

[0055] About the patch 301 to which the number "1" was given, in the case of the maximum size from which a record paper size is permitted by the same specification, only one half of the plus side tolerance of a record paper size, a print starting position is shifted on the left of patch 303, and is printed so that it may be located at the core of the longitudinal direction of a record form. Moreover, about the patch 302 to which the number "2" was given, only one fourth of the plus side tolerance of a record paper size, a print starting position is shifted on the left of patch 303, and is printed.

[0056] About the patch 304 to which the number "4" was given, only one fourth of the plus side tolerance of a record paper size, a print starting position is shifted on the right of patch 303, and is printed. About the patch 305 to which the number "5" was furthermore given, in the case of the minimum size from which a record paper size is permitted by the same specification, only one half of the plus side tolerance of a record paper size, a print starting position is shifted on the right of patch 303, and is printed so that it may be located at the core of the longitudinal direction of a record form. [0057] moreover, the thing which, as for the formation location of the lengthwise direction (the direction of vertical scanning) of each patch, each patch laps -- a user -- spacing of the specified quantity can be kept and spacing can also be kept by the size of the lengthwise direction of a patch so that it may not become hard to see.

[0058] Drawing 7 is drawing for explaining the print condition of a test pattern when a record paper size varies.

[0059] Among drawing, (a) is the case where the longitudinal direction size of a record form is the min within tolerance 309, and if it prints in the location specified at the time of formation of patch 305, a margin on either side will become equal exactly. Moreover, among drawing, (b) is the case where the longitudinal direction size of a record form is tolerance 0, and if it prints in the location specified at the time of formation of patch 303, a margin on either side will become equal exactly. Furthermore, among drawing, (c) is the case where the longitudinal direction size of a record form is the max within tolerance 309, and if it prints in the location specified at the time of formation of patch 301, a margin on either side will become equal exactly.

[0060] Again with reference to drawing 5, a user views the test pattern printed as mentioned above, chooses the patch

located at the core of a main scanning direction (longitudinal direction), and inputs the number into host equipment H through the actuation screen of a printer driver (step S2).

[0061] Furthermore, adjustment of a right-and-left margin is performed by memorizing the print starting value of the improvement in the method of horizontal scanning when forming the patch corresponding to the number inputted at step S2, and specifying the print starting position in a printing equipment on the occasion of subsequent print actuation based on the print starting position information concerned (step S3).

[0062] As mentioned above, even if a record paper size varies within tolerance by setting up suitable print starting position information and having been made to perform print actuation based on the information by printing the test pattern which consists of a patch group which shifted the print starting position of the improvement in the method of horizontal scanning little by little, finding out a suitable patch, and choosing the number, a margin with equal right and left can be obtained.

[0063] What is necessary is here, just to perform the above-mentioned margin adjustment processing timely in consideration of change of the time of exchange of a roll sheet, or an environmental condition, since lateral size is almost fixed in one roll sheet when the record form of a roll-sheet gestalt is used as a print medium. Moreover, what is necessary is just to perform the above-mentioned margin adjustment processing timely in consideration of change of an environmental condition, when a new pack is open and it sets in a recording device since it is think in 1 pack which makes the number of predetermined leaves a unit that lateral size is almost fixed when the record form of a cut sheet gestalt is use.

[0064] According to this example, a suitable margin can be set up on printing an easy test pattern. For example, since a margin on either side is equated and a print image can be located at the core of a print medium, much more high definition-ization of a print can be attained.

[0065] In addition, although the number of the band-like patches which constitute a test pattern from **** was made into five, if visual selection by the user is made easy, it can also consider as other numbers. Moreover, it is not restricted to **** from a viewpoint which makes visual selection by the user easy also with the size of each patch, or the relative formation location of the direction of vertical scanning. For example, what is necessary is just to consider, as the die length an operator can recognize the condition of a margin to be easily according to the width of face of the print medium to be used about the die length (width of face) of the longitudinal direction of a patch. Moreover, it can set suitably from the same viewpoint also about for example, the configuration of each patch, a color, and a "solid" print or gestalten, such as whether to be reticulated. For example, if the print range of a main scanning direction thru/or the amount of margins on either side can be recognized easily, each patch may not follow a main scanning direction mostly, and band-like [above] can also adopt an intermittence pattern etc.

[0066] In addition, setting out of the print starting position according to selection by the user may be directly performed to the thing performed to a printing equipment side through the printer driver by the side of host equipment as mentioned above, or a printing equipment. Moreover, even if a printing equipment does not perform such adjustment, except that a printing equipment shall adjust the print starting position of image data on the occasion of print actuation based on the set-up print starting position information Null data are appropriately added before and after the image data which host equipment H transmits, and the print object with which right-and-left margin adjustment was made as a print result may be made to be obtained by performing print actuation to the image data in which a printing equipment contains the null data.

[0067] (The 2nd example of the margin adjustment at the right end of the left) The 2nd example of the margin adjustment at the right end of the left is explained using drawing 8 - drawing 11.

[0068] The 2nd example concerned is a method which adjusts so that a margin may become right-and-left homogeneity automatically, even if it establishes a paper-end-detecting means and a record paper size varies within tolerance.

[0069] Drawing 8 is drawing which looked at the carriage 200 of drawing 2 from the record form side. Along with the guide shaft 202, a print head 1-1, 1-2, 1-3, and 1-4 are juxtaposed in the both-way direction (the direction of A) by the carriage 200 by which a scanning scan is carried out corresponding to four classification by color of cyanogen, a Magenta, yellow, and black. Two or more ink deliveries 5 are arranged at each print head top in the direction which intersects perpendicularly with the main scanning direction (the direction of A in drawing) of carriage 200. 6 is the paper-end-detecting means carried in carriage 200, and consists of a floodlighting component 7 and a light-receiving means 8.

[0070] Drawing 9 is drawing which looked at the paper-end-detecting means of drawing 8 from the side (the direction

of D in drawing), and is drawn in the condition that a record form is downward. Among drawing, ten are a platen, were installed in the record form P bottom, and have regulated the recording surface-ed of the record form P. The floodlighting component 7 is installed so that an optical axis may become vertical at the record form P. The light emitting diode (LED) which emits the cheap light of cost can be used for the floodlighting component 7 that what is necessary is just what can emit light, such as the light, infrared radiation, and ultraviolet rays. Moreover, IRED which emits light in infrared radiation may be used. These components can improve the exposure effectiveness to the record form P by making some packages of a floodlighting component into the shape of a dome.

[0071] The light-receiving means 8 is formed beside the floodlighting component 7. The light-receiving means 8 consists of optical lens 8A and a sensor 9, is floodlighted from the floodlighting component 7, condenses in response to the beam of light reflected in the record form P by light-receiving lens 8A, and receives light by the sensor 9. Since the reflected light is condensed with an optical lens 8, it is made for the field of view of a sensor 9 to become narrow. That is, the floodlighting component 7 is irradiating the range larger than the field of view of a sensor 9. The sensor 9 consists of light, such as SPD (silicon photodiode) and PSD (semi-conductor location sensing element), an infrared light sensor, non-illustrated amplifier, etc. The floodlighting component 7 and the light-receiving means 8 are juxtaposed so that it may become the side edge of a record form, and parallel.

[0072] Drawing 10 is drawing which looked at the paper-end-detecting means 6 of drawing 8 from the direction of E in this drawing. The front face of a platen 10 is made black (namely, the reflection factor of light low). A main scanning direction is made to scan the carriage 200 which carried the paper-end-detecting means 6 for moreover. When the paper-end-detecting means 6 is located on a platen, the level of the signal which the light-receiving means 8 received is low, but since the reflection factor is relatively high when it comes on the record form P, the level of a light-receiving signal becomes high.

[0073] Therefore, if, as for close, the platen 100 of the signal which the light-receiving means 8 will receive if carriage 200 is scanned leftward from the right, making the floodlighting component 7 floodlight as ON is in the field of view of the light-receiving means 8, signal level is low, and a signal will become high if, as for close, the record form P comes. If horizontal scanning of carriage 200 is continued further as it is, the light-receiving means 8 will come on a platen 10 from on the record form P, and signal level will become low at this event. Thus, it can be recognized as it being an event of the event of signal level becoming low reaching the left end of the record form P the event of the event of light-receiving signal level becoming high in process of a carriage scan reaching the right end of the record form P. Since the location of carriage 200 is clear and the physical relationship of carriage 200 and the paper-end-detecting means 6 has become settled by the linear scale 207 and its detection system 208, the paper-end-detecting means 6 will show the location of the left end of the record form P, and a right end.

[0074] It is $WH=LP-RP$, when the location of LP and a right end is set to RP for the location at the left end of the record form P and breadth of the record form P is set to WH here. By this formula, if the right-and-left ends location of the record form P is known, the longitudinal direction size of the record form P will also become clear.

[0075] Drawing 11 is a flow chart for explaining actuation in the automatic margin adjustment mode concerning this example.

[0076] If margin adjustment mode is set up like the 1st above-mentioned example through the printer driver which works on host equipment H, this procedure will start, and the width of face of the record form P is computed by measuring the right-and-left ends location of the record form P by carrying out horizontal scanning of the carriage 200 as mentioned above in step S4. Next, a print starting position is computed and margin adjustment is made to be performed at step S5. Thus, if a print starting position is decided, on the occasion of subsequent print actuation, a print starting position will be specified based on the print starting position information concerned.

[0077] Here, since it is desirable to make print width of face regularity even if it expands and contracts the width of face of the record form P by environmental conditions, such as a manufacture error and humidity, dispersion in the breadth of a record form can be amended in the amount of margins.

[0078] Since the count approach of a printing starting position is $WW=(WH-WP)/2$ when WW and print width of face of a main scanning direction are set to WP for margin width of face, if a printing starting value is set to STP, this will be called for by the following formula.

When $STP=RP+WW$, for example, a record paper size, is made into A4 (every length), the longitudinal direction size of this record form is 210mm by specification, and print size will be set to 204mm if a margin on either side is set to 3mm, respectively. Since the actual breadth of a record form is $308-100=208$ mm here supposing it is $RP=100$ mm and

LP=308mm, they are margin: $(208-204) / 2 = 2\text{mm}$ print starting value. : It may be $100+2=102\text{mm}$. That is, in this example, when it was as specification and the record form which is the breadth of 210mm is the breadth of 208mm actually, if a print is started using a print starting position as 102mm, an every 2mm equal margin will be prepared in the right-and-left ends of a record form.

[0079] According to this example, a suitable margin can be set up even if it does not print a test pattern like the 1st above-mentioned example. For example, since a margin on either side is equated and a print image can be located at the core of a print medium, much more high definition-ization of a print can be attained. That is, since resist adjustment (adjustment of an image write-in location) of the print starting position in an image output means slack printing equipment is performed automatically, on the occasion of print-out, easy and exact margin adjustment is realizable.

[0080] In addition, setting out of the print starting position according to an above operation thru/or this above is transmitting the thing which the printing equipment's itself performs, or the detection result by the paper-end-detecting means 6 to host equipment H, and may be performed by the host equipment side. Moreover, even if a printing equipment does not perform such adjustment except that a printing equipment shall adjust the print starting position of image data on the occasion of print actuation based on the print starting position information acquired thru/or set up by the operation Null data are appropriately added before and after the image data which host equipment H transmits, and the print object with which right-and-left margin adjustment was made as a print result may be made to be obtained by performing print actuation to the image data in which a printing equipment contains the null data.

[0081] (in addition to this) In addition, with the operation gestalt explained above, although the case where this invention was applied to the printing equipment of the ink jet method which breathes out ink from a recording head to a print medium, and forms an image was described, this invention is not limited to the configuration. If it prints by moving a print head and a print medium relatively, a thermal type, a thermal transfer printer, etc. are effective also about which printing equipment regardless of a method.

[0082] However, in using especially an ink jet recording method, it has means (for example, an electric thermal-conversion object, a laser beam, etc.) to generate heat energy as energy used also in it in order to make the ink regurgitation perform, and brings about the effectiveness which was excellent in the recording head of the method, which makes the change of state of ink occur with said heat energy, and the recording device. It is because the densification of record and highly minute-ization can be attained according to this method.

[0083] About the typical configuration and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 description and the 4740796 description, for example is desirable. Although this method is applicable to both the so-called mold on demand and a continuous system On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the case of the mold on demand By impressing at least one driving signal which gives the rapid temperature rise which supports recording information and exceeds nucleate boiling Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a recording head is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by one to one as a result, it is effective. A liquid (ink) is made to breathe out through opening for regurgitation by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into a pulse configuration, since growth contraction of air bubbles will be performed appropriately instantly, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of this pulse configuration, what is indicated by the U.S. Pat. No. 4463359 description and the 4345262 description is suitable. In addition, if the conditions indicated by the U.S. Pat. No. 4313124 description of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.

[0084] As a configuration of a recording head, the configuration using the U.S. Pat. No. 4558333 description and U.S. Pat. No. 4459600 description which indicate the configuration arranged to the field to which the heat operation section other than the combination configuration (a straight-line-like liquid flow channel or right-angle liquid flow channel) of a delivery which is indicated by each above-mentioned description, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, the effectiveness of this invention is effective also as a configuration based on JP,59-138461,A which indicates the configuration whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the configuration which uses a common slit as the discharge part of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to a discharge part. Namely, no matter the gestalt of a recording head may be what thing, it is because it can

record now efficiently certainly according to this invention.

[0085] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the die length corresponding to the maximum width of the record medium which can record a recording device. What is necessary is just to appoint the range of the delivery to be used so that a suitable quantity of a margin may be established corresponding to dispersion in the width of face of a print medium although any of the configuration which fills the die length with the combination of two or more recording heads, and the configuration as one recording head formed in one are sufficient as such a recording head.

[0086] In addition, this invention is effective also when the thing of a serial type like the example of a top also uses the recording head fixed to the body of equipment, the recording head exchangeable chip type to which the electric connection with the body of equipment and supply of the ink from the body of equipment are attained by the body of equipment being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.

[0087] Moreover, as a configuration of the recording device of this invention, since the effectiveness of this invention can be stabilized further, it is desirable to add the regurgitation recovery means of a recording head, a preliminary auxiliary means, etc. If these are mentioned concretely, a preheating means to heat using the capping means, the cleaning means, the application of pressure or the attraction means, the electric thermal-conversion object, the heating elements different from this, or these combination over a recording head, and an auxiliary discharge appearance means to perform the regurgitation different from record can be mentioned.

[0088] Moreover, although only one piece was prepared also about the class thru/or the number of a recording head carried, for example corresponding to monochromatic ink, corresponding to two or more ink which differs in an others and record color or concentration, more than one may be prepared the number of pieces. That is, although not only the recording mode of only mainstream colors, such as black, but a recording head may be constituted in one as a recording mode of a recording device or the paddle gap by two or more combination is sufficient, for example, this invention is very effective also in equipment equipped with at least one of each of the full color recording mode by the double color color of a different color, or color mixture.

[0089] Furthermore, in addition, in the operation gestalt of this invention explained above, although ink is explained as a liquid It is ink solidified less than [a room temperature or it], and what is softened or liquefied at a room temperature may be used. Or by the ink jet method, since what carries out temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in the stability regurgitation range about the viscosity of ink, ink may use what makes the shape of liquid at the time of activity record signal grant. In addition, in order to prevent the temperature up by heat energy positively because you make it use it as energy of the change of state from a solid condition to the liquid condition of ink, or in order to prevent evaporation of ink, the ink which solidifies in the state of neglect and is liquefied with heating may be used. Anyway, ink liquefies by grant according to the record signal of heat energy, and this invention can be applied also when using the ink of the property which will not be liquefied without grant of heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record medium. The ink in such a case is good for a porosity sheet crevice or a breakthrough which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the condition of having been held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.

[0090] Furthermore, in addition, as a gestalt of this invention ink jet recording device, although used as an image printing terminal of information management systems, such as a computer, the gestalt of the reproducing unit combined with others, a reader, etc. and the facsimile apparatus which has a transceiver function further may be taken.

[0091] Moreover, although the printer driver by the side of host equipment H supplies image data to a printing equipment with an above-mentioned operation gestalt, host equipment H may supply what a printing equipment side equips with the data of the test pattern in the 1st example of right-and-left margin adjustment.

[0092] The program code of the software or the printer driver which realizes the function of the above-mentioned implementation gestalt is supplied to the computer in the machine to which various devices containing a printing equipment were connected, or a system, and the print system which was made to realize the function of the above-mentioned implementation gestalt is also contained in the range of this invention by operating various devices with the program code stored in the computer of a machine or a system.

[0093] In this case, the program code itself will realize the new function of this invention, and a means to supply

program codes, such as that program code itself and a storage, to a computer is also included in the range of this invention.

[0094] As a storage for supplying a program code, a floppy (trademark) disk, a hard disk, an optical disk, a magneto-optic disk, CD-ROM, CD-R, a magnetic tape, the memory card of a non-volatile, ROM, etc. can be used, for example.

[0095] Moreover, by performing the program code which the computer read, also when the function of the operation gestalt mentioned above is not only realized, but it performs a part or all of processing that OS which is working on a computer is actual, based on directions of the program code and the function of this operation gestalt is realized by the processing, it is contained.

[0096] Furthermore, after the program code by which reading appearance was carried out from the storage is written in the memory with which the functional expansion unit connected to the functional add-in board inserted in the computer or the computer is equipped, a part or all of processing that CPU with which the functional add-in board and functional expansion unit are equipped is actual performs, and also when the function of this operation gestalt is realized by the processing, it is contained based on directions of the program code.

[0097]

[Effect of the Invention] It can print with a suitable margin, without producing complication and the formation of an expensive rank of the configuration of a printing equipment according to this invention, even if dispersion is in the size of a print medium as explained above.

[Translation done.]